Center Innovation Fund: JSC CIF

Implementation of Diagnostic Model for Integrated System Health Monitoring of a Habitat Instrumentation System

Completed Technology Project (2012 - 2013)

Project Introduction

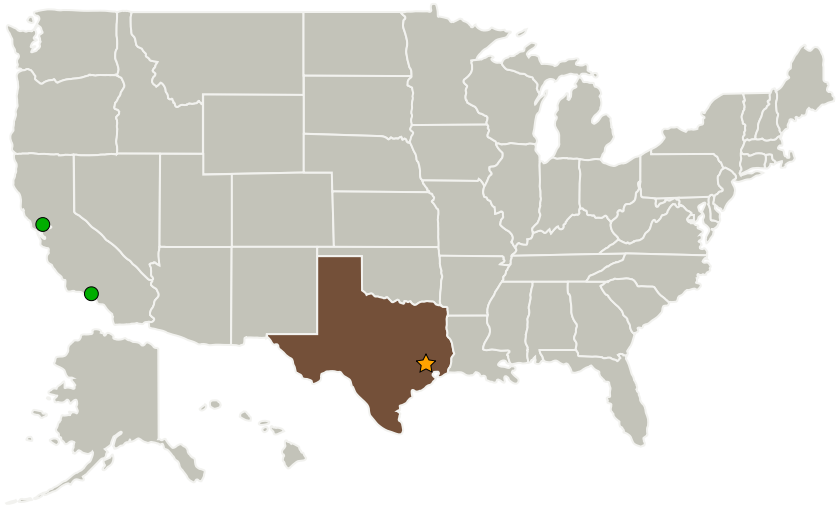
This project seeks to develop a method by which to optimize instrumentation systems against multiple variables. The project leverages a diagnostic model developed under the OCT GCD Autonomous Systems Project (TEAMS) to optimize the Deep Space Habitat sensor and instrumentation system. The results will be validated through hardware-in-the-loop testing.

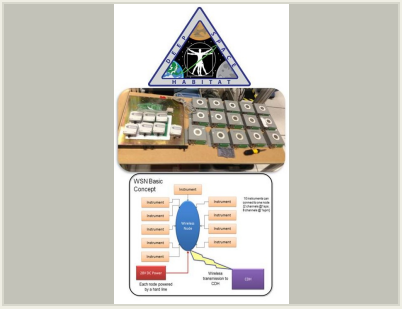
The approach to developing this tool are the following: to use SysML to model the instrumentation system, to develop a method to seamlessly transfer data from SysML to TEAMS to perform testability/observability analysis, to develop a multi-variate optimization technique to examine testability, observability, mass, and cost optimization, to transfer data from SysML to the optimization tool, and to perform the optimization.

Anticipated Benefits

Anticipated benefits to NASA missions would include integration with AES L2 Habitat Ground Test Unit (MPLM/Cygnus). Future work would expand upon the variables considered, investigate larger and more complex instrumentation systems, long-term analysis, implementation of control logic, and integration with Advanced Caution and Warning to provide an integrated system.

Primary U.S. Work Locations and Key Partners





Project Image Implementation of Diagnostic Model for Integrated System Health Monitoring of a Habitat Instrumentation System

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Organizations Performing Work	Role	Type	Location
Johnson Space Center(JSC)	Lead Organization	NASA Center	Houston, Texas
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations
Texas

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Johnson Space Center (JSC)

Responsible Program:

Center Innovation Fund: JSC CIF

Project Management

Program Director:

Michael R Lapointe

Program Manager:

Carlos H Westhelle

Project Manager:

Kristina Rojdev

Principal Investigator:

Kristina Rojdev

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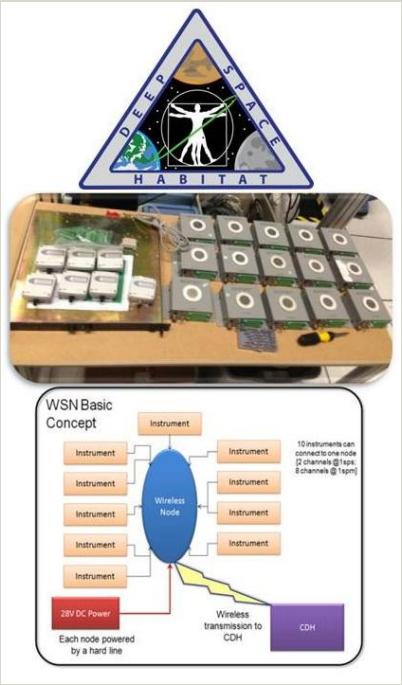
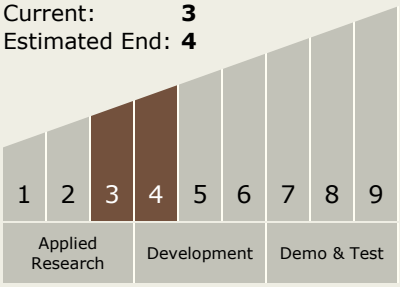
Images



12085-1375997237583.jpg
Project Image Implementation of Diagnostic Model for Integrated System Health Monitoring of a Habitat Instrumentation System *(https://techport.nasa.gov/image/2185)*

Technology Maturity (TRL)

Start: **3**
Current: **3**
Estimated End: **4**



Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
  - TX11.5 Mission Architecture, Systems Analysis and Concept Development
    - TX11.5.2 Tools and Methodologies for Performing Systems Analysis